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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,925	10/10/2003	Alan Courtay	SYN-0512	2232

35273 7590 12/20/2006
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EXAMINER	
GUILL, RUSSELL L	
ART UNIT	**PAPER NUMBER**
2123	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/20/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/683,925	Applicant(s) COURTAY, ALAN	
	Examiner Russ Guill	Art Unit 2123	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1 - 10 have been examined. Claims 1 - 10 have been rejected.

Claim Objections

2. Claim 8 is objected to because of the following informalities: The claim recites in lines 2 - 3, "analog variables defined through equations in the same states share a common state vector". The phrase appears to mean, "analog variables, defined through equations in the same states, share a common state vector" (please note the commas). Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 1 - 10** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

a. Regarding **claims 1 - 10**, the claims are directed to a modeling tool, which appears to be a set of functional material per se (software), and as such, is non-statutory because it does not fall into one of the statutory categories.

b. Regarding **claims 1 - 10**, the recited modeling tool appears to contain abstract ideas such as a composite equation. Therefore, to be statutory, the claim must be directed to a practical application producing a concrete, useful and tangible result. The claims do not appear to produce a tangible result needed to support a practical application. The result of the claim appears to be a composite equation, which does not appear to provide a tangible result.

c. Regarding **claims 1 - 10**, the recited modeling tool appears to contain abstract ideas such as "forming a composite equation". Therefore, to be statutory, the claim must be directed to a practical application producing a concrete, useful and tangible result. The claim does not appear to produce a useful result needed to support a practical application. For a result to be useful, the result must have a utility that is specific, substantial and credible. The result of the claim appears to be a composite equation, which does not appear to provide a well-defined, particular and immediate benefit that would support a specific and substantial utility. Further, the MPEP recites (2106, IV, C, 2., (2), a) USEFUL RESULT): "In addition, when the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three 35 U.S.C. 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical application. In such cases, statements in the specification describing a practical application may not be sufficient to satisfy the requirements for section 101 with respect to the claimed invention". The Examiner respectfully requests that the claim be amended to recite the practical application (i.e., a concrete, useful and tangible result) in the claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1 - 2 and 4 - 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Antsaklis (Panos J. Antsaklis, "Special Issue on Hybrid Systems: Theory and Application A Brief Introduction to the Theory and Applications of Hybrid Systems", July 200, Proceedings of the IEEE, Volume 88, Number 7, pages 879 - 887) in view of Christen (Ernst Christen et al.; "VHDL-AMS – A Hardware Description Language for Analog and Mixed-Signal Applications", October 1999, IEEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing, Volume 46, Number 10, pages 1263 - 1272).

a. The Examiner remarks that admitted prior art of the Applicant appears to teach claim 1 in paragraphs [0005] – [0007] of the specification. Automating a manual process does not distinguish over the prior art.

b. The art of Antsaklis is directed toward hybrid dynamical systems (**page 879, section I. Introduction**).

c. The art of Christen is directed toward VHDL-AMS – a hardware description language for analog and mixed-signal applications (Title).

d. The art of Antsaklis and the art of Christen are analogous art because they are both concerned with mixed signal applications (**Antsaklis, page 879, section I. Introduction, first paragraph, "Hybrid dynamical systems generate variables or signals that are mixed signals . . . "; and Christen, page 1263, Title**).

e. The motivation to use the art of Christen with the art of Antsaklis would have been the benefits recited in Christen that the major advantages of HDL-based design are top-down design and indefinite extensibility using stored components **(page 1263, section I. Introduction, second paragraph that starts with, "Modern HDL's support . . .")**.

f. Regarding **claim 1**:

g. Ansaklis appears to teach:

h. allowing a user to define an analog variable through a set of state equations corresponding to different states in the state diagram (**page 879, section A. Hybrid Systems, first paragraph**);

i. Antsaklis does not specifically teach:

j. forming a composite equation for the analog variable constructed as a weighted sum of the set of state equations;

k. using a set of ramp functions as weights in the composite equation varying continuously between 0 and 1, the set of ramp functions forming a state vector and ensuring continuity of the analog variable during a state transition.

l. Christen appears to teach:

m. forming a composite equation for the analog variable constructed as a weighted sum of the set of state equations (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . ."**);

n. using a set of ramp functions as weights in the composite equation varying continuously between 0 and 1, the set of ramp functions forming a state vector and ensuring continuity of the analog variable during a state transition (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . ."**).

o. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Antsaklis with the art of Christen to produce the claimed invention.

p. Regarding **claim 2**:

q. Antsaklis does not specifically teach:

r. allowing the user to set a profile, selected from linear and cubic, and a transition time for the state transition, thereby matching real behavior of the system.

s. Christen appears to teach:

t. allowing the user to set a profile, selected from linear and cubic, and a transition time for the state transition, thereby matching real behavior of the system (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . ."**).

u. Regarding **claim 4**:

v. Antsaklis does not specifically teach:

w. the state vector ensures continuity of the analog variable when a new transition occurs before the transition time of a previous transition has elapsed.

x. Christen appears to teach:

y. the state vector ensures continuity of the analog variable when a new transition occurs before the transition time of a previous transition has elapsed (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . ."**).

z. Regarding **claim 5**:

aa. Antsaklis does not specifically teach:

bb. the mixed-signal finite state machine model goes through a continuum of intermediate states contained in a hypercube space where summed state vector components equal 1.

cc. Christen appears to teach:

dd. the mixed-signal finite state machine model goes through a continuum of intermediate states contained in a hypercube space where summed state vector components equal 1 (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . .")**.

ee. Regarding **claim 6**:

ff. Antsaklis does not specifically teach:

gg. only one state in the state diagram is required to carry an equation for the analog variable, this state being an initial state.

hh. Christen appears to teach:

ii. only one state in the state diagram is required to carry an equation for the analog variable, this state being an initial state (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . .")**.

jj. Regarding **claim 7**:

kk. Antsaklis does not specifically teach:

ll. allowing a user to define a plurality of analog variables through equations associated with different states in the state diagram, the plurality of analog variables being associated with a minimum set of state vectors.

mm. Christen appears to teach:

nn. allowing a user to define a plurality of analog variables through equations associated with different states in the state diagram, the plurality of analog variables being associated with a minimum set of state vectors (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . .")**.

oo. Regarding **claim 8**:

pp. Antsaklis does not specifically teach:

qq. the minimum set of state vectors is obtained by having analog variables defined through equations in the same states share a common state vector.

rr. Christen appears to teach:

ss. the minimum set of state vectors is obtained by having analog variables defined through equations in the same states share a common state vector (**page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . .")**.

tt. Regarding **claim 9**:

uu. Antsaklis does not specifically teach:

vv. allowing the user to express the set of state equations in an implicit or explicit form.

ww. Christen appears to teach:

xx. allowing the user to express the set of state equations in an implicit or explicit form (**page 1265, left-side column, third paragraph that starts, "In addition to . . ."; and page 1269, figure 7, next to last line defining vout; and page 1269, left-side column, second paragraph that starts with, "An alternative mechanism . . .")**.

yy. Regarding **claim 10**:

zz. Antsaklis does not specifically teach:

aaa. `ensuring that the analog variable is not defined through equations associated with concurrent states.`

bbb. Christen appears to teach:

ccc. `ensuring that the analog variable is not defined through equations associated with concurrent states (`**`page 1265, section C. Simultaneous Statements`**`).`

7. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ansaklis as modified by Christen as applied to claims **1 - 2 and 4 - 10** above, and further in view of Kazmierski (Tom J. Kazmierski; "Fuzzy-logic digita-analogue interfaces for accurate mixed-signal simulation", 1998, Proceedings of the conference on Design, automation and test in Europe, pages: 941 - 944).

a. **Regarding claim 3**, Ansaklis as modified by Christen teaches a modeling tool, as recited in claims **1 - 2 and 4 - 10** above.

b. The art of Kazmierski is directed to fuzzy logic analog-digital interfaces for accurate mixed signal simulation (**Title**).

c. The art of Kazmierski and the art of Ansaklis as modified by Christen are analogous art because they both contain the art of mixed signal simulation (**Antsaklis, page 879, section I. Introduction, first paragraph, "Hybrid dynamical systems generate variables or signals that are mixed signals . . . "; and Christen, page 1263, Title; and Kazmierski, Title**).

d. The motivation to use the art of Kazmierski with the art of Ansaklis as modified by Christen would have been the benefit recited in Kazmierski numerical problems of mixed signal interfacing that put most circuit level simulators into difficulties can be addressed by using fuzzy logic interface (**page 943, section 4. Conclusion**).

e. Ansaklis as modified by Christen does not specifically teach:

f. `the cubic profile provides continuity in the first derivative for the analog variable during the state transition.`

g. Kazmierski appears to teach:

h. `the cubic profile provides continuity in the first derivative for the analog variable during the state transition (`**`page 941, figure 1`**`).`

i. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Ansaklis as modified by Christen with the art of Kazmierski to produce the claimed invention.

8. **Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the Applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. The entire reference is considered to provide disclosure relating to the claimed invention.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure:

a. Raghavan (U.S. Patent Application Publication 2002/0167544) teaches a modeling tool generating a mixed-signal finite state machine model of a system from a state diagram.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russ Guill whose telephone number is 571-272-7955. The examiner can normally be reached on Monday - Friday 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Any inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Russ Guill
Examiner
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12/15/06

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